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NOTES ON CARANGIN FISHES

IV.—ON *CARANX CRYSOS* (MITCHILL)[1]

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Though *Caranx crysos* is a common species, there is considerable doubt regarding the habit of its early stages, and only one specimen of it less than 100 mm. in standard length has come into my hands. This specimen has a recognizably different color pattern from related forms at a comparable size, and is here described so that the species may be recognized where it might otherwise be overlooked. It was taken among gulf weed in the easterly edge of the Gulf Stream off Bimini, Bahamas, July 19 to 22, by the Michael Lerner Expedition of 1937, and is figured with a somewhat larger *Caranx ruber* with the same data, for comparison. Young *Caranx ruber* from 17.5 to 43 mm. standard length were common in the weed at this date (Copeia, 1937 (4), p. 236).

The specimen of *Caranx crysos* is 22 mm. in standard length. Its color in alcohol is pale thickly punctulate with dark spots of varying size, the largest of which are round and conspicuous under a hand lens. The spinous dorsal is dusky and other fins pale. Depth in standard length is 2.4; head, 2.7 1/2. Eye in head, 3.2; pectoral (bluntly pointed), 1.8 1/2. Curve of lateral line (chord) in straight part, 1.7. Twenty-two dorsal and 20 anal soft rays can be counted; about 33 poorly developed scutes, and about 24 gill-rakers on the lower limb of the first arch.

It is interesting to compare the variation and growth changes in a series of 13 *Caranx crysos* of 129 to 235 mm. standard length with those in a series of 19 *C. hippos* of 117 to 245 mm., both obtained at Beaufort, North Carolina, by Sidney Shapiro in July and August, 1938. For one thing in the *C. hippos* series the proportion between curved part of the lateral line and its straight part varies little with no significant change with size of fish. Six specimens of 117 to 130 mm. have the curve (that is, its chord measured with a pair of dividers) in straight part, 1.0 to 1.1 (average 1.02); seven of 160 to 167 mm., 0.9 to 1.1 (1.02); six of 235 to 245 mm., 0.9 1/2 to 1.1 (1.05). On the other hand, in six *C. crysos* from 129 to 165 mm. this measurement varies from 1.5 to 1.8 (average

[1] Results of the Michael Lerner Ichthyological Expeditions, No. 16.

1.60); in seven from 170 to 235 mm., from 1.6 to 1.9 (1.77). Of this increase in proportional length of the straight part of the lateral line, more hereafter.

To make the series of *Caranx crysos* more representative of the species I have added to it available material in The American Museum of Natural History as follows: one specimen 110 mm. long from Haiti, one 124 mm. long from Trinidad, seven 129 to 152 mm. long from Venezuela, and five 103 to 132 mm. long from Rio de Janeiro (W. J. Morden Expeditions), also one of 311 mm. from Natal, Brazil (E. C. Starks). This gives 28 specimens ranging from 103 to 311 mm. standard length. Their dorsal soft rays, usually 23, vary from 21 to 24

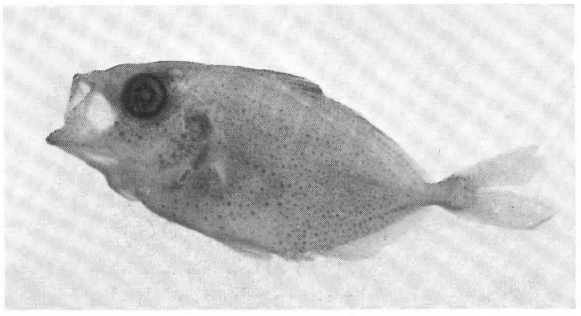

Fig. 1. *Caranx crysos*, 22 mm. standard length, A.M.N.H. No. 13750, photograph by Myron Gordon.

(average 22.8); anal, usually 19, often 20, vary from 18 to 21 (average 19.4). Irrespective of size of fish or relative length of straight part of lateral line, the scutes are variable, sometimes stopping an appreciable distance short of its front end, sometimes a scute or two on the commencement of the arch; scutes vary from 40 to 50 (average 45.6). Gill-rakers on the lower limb of the first arch vary from 25 to 33 (average 27.9).

Comparing them by size groups, at 103 to 132 mm. standard length (11 specimens), depth in this length is 2.6 to 3.0 (average 2.93); head, 3.3 to 3.6 (3.46); eye in head, 3.5 to 4.0 (3.69); greatest width, 1.9 to 2.3 (2.08); pectoral, 0.9 1/2 to 1.2 (1.03); curve of lateral line in straight part, 1.5 to 1.7 (1.59).

At 140 to 165 mm. (9 specimens), depth is 2.8 to 3.0 (average 2.90); head, 3.4 to 3.7 (3.58); eye in head, 3.6 to 4.2 (3.84); width, 1.8 to 2.0

(1.94); pectoral, 0.9 to 1.0 (0.97); curve of lateral line in straight part, 1.5 to 1.8 (1.64).

At 170 to 311 mm. (8 specimens), depth is 2.8 to 3.3 (average 2.97 1/2); head, 3.5 to 3.8, (3.62 1/2); eye in head, 3.8 to 5.0 (4.10); width, 1.7 to 1.9 (1.84); pectoral, 0.7 1/2 to 0.9 (0.83); curve of lateral line in straight part, 1.6 to 1.9 (1.76).

The variability and increase in comparative length of the straight part of lateral line with size of fish definitely shown by *Caranx crysos* seem to be unusual. For instance, in the *Caranx melampygus* studied from the Hawaiian Islands there is a notable decrease in its comparative length (Copeia, 1935 (4), p. 192). Presumably it is a matter of different relative growth, the posterior part of the body growing more in

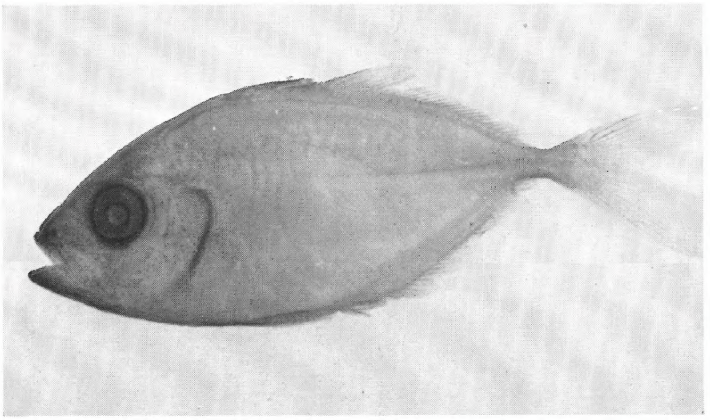

Fig. 2. *Caranx ruber*, 30 mm. standard length, A.M.N.H. No. 13751, photograph by Myron Gordon.

crysos, the anterior part more in *melampygus*. This introduces a theoretical consideration of the arch in the lateral line and short body cavity characteristic of carangin fishes. In the less specialized bluefish *Pomatomus saltatrix* with caranx-like form and swimming habits but longer body cavity there is no such arch, the lateral line descends in a gentle curve and becomes straight only in the center of the peduncle as is usual in fishes. Is it not reasonable to suppose that the development of the arch in carangin phylogeny has been as much by expansion of the peduncular region carrying the inherited central position of its lateral line forward and incidentally making a more or less abrupt arch of the anterior portion, as by realignment of the line to correlate with realign-

ment of deeper seated structures. There must have been realignment of structures incidental to the change to short body-cavitied carangins from more normal longer body-cavitied fishes, but it seems not unlikely that expansion of peduncular elements in phylogeny played a considerable part in these changes. On the other hand, perhaps it is merely the symmetrical character of the peduncular musculature which has been carried forward, and this determines the central position of the lateral line, and has also limited the body cavity posteriorly. In any event the slight lengthening of the straight part of the lateral line in *Caranx crysos* ontogeny is easy to correlate with environmental adaptation of that particular fish. The slender swift-swimming phase characteristic of these fishes in general is particularly well marked in this species and persists to sizes where various related forms show signs of relative slowing down.